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# A National Environmental/Energy Workforce Assessment. Nebraska

National Field Research Center, Inc, Iowa City, Iowa

Prepared for

Environmental Protection Agency, Washington, D C

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16. ABSTRACT

This study is one of 70 volumes assessing the workforce needs (manpower needs) for pollution control and abatement in the United States for the five-year period of 1976 through 1981. Seven fields for pollution control — air, noise, pesticides, potable water, radiation, solid waste, and wastewater — are analyzed, together with energy-related programs currently accentuated by the national effort to solve energy supply problems.

Designed as Phase I of a three-phase program, the complete assessment includes the following volumes: one each for the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands; one for each of the ten EPA regions; a one-volume National Abstract; a volume on National Legislation; a volume on Business and Industry; and a four-volume National Summary. The information was gathered through extensive personal interviews with responsible federal, state, and local officials in every state; with officials of representative private industrial and commercial firms; and with representatives of national industrial and trade organizations.

Phase II will develop a broad national inventory of the entire range of post-secondary and higher education training offered in the pollution control and energy areas cited above, and Phase III will offer demonstrations for curriculum changes or modifications which appear necessary to assure an adequate and properly trained national environmental/energy workforce.

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| State Planning | Energy Management | | |
| State Agencies | Pollution Control | | |
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# A National Environmental/Energy Workforce Assessment

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**Conducted by:**

**National Field Research Center, Inc.**

**P.O. Box 287**

**Iowa City, Iowa 52240**

NATIONAL ENVIRONMENTAL/ENERGY

WORKFORCE ASSESSMENT

for

# NEBRASKA

Conducted by:

NATIONAL FIELD RESEARCH CENTER, INC

Under Grant from:

UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

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This document has been reviewed by the Environmental Protection Agency and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

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# PREFACE

This report presents existing workforce levels, training programs, and career potentials and develops staffing level projections (1976-1981) based on available information for the State of Nebraska in the environmental pollution control areas of air, noise, potable water, pesticides, radiation, solid waste, wastewater, and energy. This study was carried out for the United States Environmental Protection Agency by National Field Research Center of Iowa City, Iowa.

The information and data presented in this report were compiled in large part from extensive interviews with professionals working in the respective areas and were supplemented by telephone surveys and research.

# FOREWORD

The material herein contains the information and data collected for eight individual pollution control inventories conducted for Nebraska. The format includes workforce profiles, projections, growth and career potential for each of the areas investigated. Growth projections are necessarily based on best professional estimates developed from available information and represent what are felt to be realistic figures by experts in the respective areas. The pollution control areas considered by this study are as follows:

Air

Noise

Pesticides

Potable Water

Radiation

Solid Waste

Wastewater

Energy

# National Environmental Energy Workforce Assessment

## Phase I

# NEBRASKA

## State Summary

## I. AIR

Nebraska air pollution problems are those associated with motor vehicle emissions and suspended particulates.

The Department of Environmental Control's Air Pollution Control Division is the state lead agency dealing with air pollution matters, although local air quality programs are conducted in Omaha and Lincoln. Monitoring air pollutants and providing technical assistance are the major program functions at both the state and local level.

A total of 12 persons comprises the staff of the Air Pollution Control Division with its two sections: Engineering, and Surveillance and Enforcement. An equivalent of 14 full-time persons staff the local air pollution control programs. Engineers with civil, chemical or air pollution backgrounds and scientists with chemistry or biology training are the major professional categories.

Nebraska's air agencies have experienced substantial growth in recent years, and very little staff expansion is seen for the next five years at either the state or local level. Highly-trained personnel will be required for any openings which may exist, particularly in light of a 15% to 20% annual turnover rate in these positions. Future amendments to the Clean Air Act and increased efforts to prevent deterioration of air quality may result in some workforce growth not foreseen at this time.

## II. NOISE

Noise is not currently a high-priority environmental area in Nebraska. The only attempts to regulate noise are found in a statute relating to heavy-duty motor vehicles and six municipal noise ordinances in various parts of the state.

The Air Pollution Control Division within the Department of Environmental Control is the state lead agency for noise matters, but no one on its staff is designated as full-time in the noise field. Local noise ordinances are enforced by law enforcement personnel in the respective areas. No information is available on the number of persons involved in this activity, but it is probably minimal.

Little workforce growth and few career opportunities are anticipated in Nebraska's noise program over the next five years. The use of sophisticated noise monitoring equipment and greater concern with consumer product noise and motor vehicle noise are factors which could affect workforce in this area in future years.

## III. PESTICIDES

The use of pesticides in an agricultural state such as Nebraska has always been important. The workforce implications of pesticide use have changed dramatically in recent years with the passage of the Federal Environmental Pesticide Control Act.

The Department of Agriculture is the state lead agency for pesticide activities with specific responsibility being in the Feed and Agricultural Chemical Division. The University of Nebraska Cooperative Extension has provided assistance in applicator training sessions.

A staff of four persons handles pesticide matters for the Feed and Agricultural Chemical Division. Eight additional Department inspectors work on pesticide matters to a limited extent. Three other people are involved in pesticide analysis and education coordinating activities. It is estimated that as many as 40,000 farmers and 3,000 commercial applicators may be certified to apply restricted-use pesticides.

Staff growth in the pesticides public sector will be limited over the next five years as it is felt that the current staff is adequate to fulfill responsibilities. Some additional growth in the number of applicators may develop although the program is so new that projections are difficult to make. Persons with agricultural background will be most in demand, with the need for greater yields and less pesticide run-off being areas of growing concern.

## IV. POTABLE WATER

Potable water supplies in Nebraska are the responsibility of the Division of Environmental Engineering within the Department of Health. In 1976 a state Safe Drinking Water Act became law and is administered by the Division; it is through this law that the state is attempting to gain primacy in drinking water matters. The Department of Water Resources has an ancillary role in water supply matters.

The Division of Environmental Engineering has a staff of ten persons in its Lincoln office. Civil engineers and engineer aides are the most common professional areas. The Department of Water Resources has a staff of 30 employees, mostly hydrographers and water resource technicians, but only a small portion of their time is devoted to potable water matters.

Growth over the next five years is expected to be considerable in the Division and a staff of approximately 27 persons is expected. Safe Drinking Water Act mandates account for most of the growth, and career potential appears to be best for engineers and scientists.

A mandatory water supply operator certification program is being phased in, in Nebraska. There are approximately 250 operators certified under a voluntary program, but as many as 1,500 persons may eventually require certification.

## V. RADIATION

Radiation protection matters in Nebraska are the responsibility of the Division of Radiological Health within the Department of Health. The Radiation Control Act for the state was substantially amended in 1975 and deals with both ionizing and non-ionizing radiation.

The Division has a staff of five people, three of whom are classified as radiological health specialists. The nine-member Radiation Advisory Council is not a part of the Division staff, but does provide technical support services.

The Division of Radiological Health has grown from a staff of one in 1970 and expectations are that there will be eight employees by 1981. All growth is expected to be in the category of radiological health specialist. Retention of top level personnel has been a problem in the past because of the salary structure.

As nuclear power becomes more prominent in Nebraska and more such facilities are put into operation, workforce needs in this area will increase. Highly trained persons in radiation and physics may be needed in the public and private sectors in the 1980s.

## VI. SOLID WASTE

Solid waste management is becoming an area of greater concern in Nebraska as in many other states. The Solid Waste Pollution Control Division within the Department of Environmental Control is the state lead agency for regulating disposal and land quality problems.

The Solid Waste Pollution Control Division has a staff of seven persons in its two sections - State Planning, and Surveillance and Enforcement. Engineers with chemical or sanitary training, together with life scientists, are the most common professions on the staff.

Significant workforce growth is expected in the Division, largely as a result of the Resource Conservation and Recovery Act. Environmental specialists, life scientists and engineers would all be added in proposals to increase the staff to 16 persons. Consideration is also being given to enactment of a state litter control law which would impose additional workforce needs on the Solid Waste Pollution Control Division. Disposal site personnel training and the potential need for planners under the new federal legislation are other areas of concern.

## VII. WASTEWATER

Water is a crucial resource for the State of Nebraska, and its quality must be protected for human, industrial and agricultural uses. The Department of Environmental Control's (DEC) Water Pollution Control Division has primary responsibility for water pollution control matters in the state. The Agricultural Pollution Control Division is another branch of DEC which protects water quality through regulation of confined livestock feeding operations. The Natural Resources Commission is also concerned with water quality and has a major state role in Section 208 planning under PL 92-500.

The two DEC Divisions have a combined staff of 50 persons; life scientists reporesent the most common professional category with a large complement of sanitary and agricultural engineers. The Natural Resources Commission has a staff of 63 although only a portion of these are involved in water pollution matters. Civil engineers and engineer technicians are the most common professions in this agency.

Because of increasing legislative mandates, significant workforce growth is expected in Nebraska's water pollution control agencies over the next five years. The Water Pollution Control Division expects to increase the number of engineers and life scientists on staff.

Section 208 planning and discharge limitation requirements are the most commonly cited reasons for increasing personnel levels.

## VIII. ENERGY

Nebraska has few energy resources; it has limited oil and gas production and is just beginning to develop a number of nuclear power plants. For this reason, most state energy activity is directed toward allocation and conservation measures.

The State Energy Office within the Department of Revenue, is the primary energy agency and is staffed by seven persons. Three members of the staff are engineers and act as energy coordinators. The Oil and Gas Conservation Commission was established to curb wasteful oil and gas production practices; it has a staff of four persons, including three Commission members.

Very little growth is expected in Nebraska's energy agencies over the next five years. The Energy Office has declined from a staff of 11 in 1974 and a return to this level is not likely unless stringent allocation and management guidelines are re-imposed. Some workforce growth for public utilities can be anticipated as planned nuclear power facilities become operational.

STATE OF NEBRASKA - SUMMARY

National Environmental/Energy Workforce Assessment
Pollution Control & Abatement Personnel
Projected Workforce Requirements (1976-1981)

| Environmental Area | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | %/annum growth (average) |
|---|---|---|---|---|---|---|---|
| AIR[1] | 12 | 12 | 12 | 12 | 12 | 12 | 0% |
| NOISE[2] | -- | -- | -- | -- | -- | -- | -- |
| PESTICIDES[3] | 6 | 7 | 9 | 9 | 9 | 9 | 9% |
| POTABLE WATER[4] | 10 | 11 | 17 | 20 | 24 | 27 | 23% |
| RADIATION[5] | 5 | 6 | 6 | 7 | 7 | 8 | 10% |
| SOLID WASTE[6] | 7 | 9 | 14 | 16 | 17 | 17 | 21% |
| WASTEWATER[7] | 39 | 43 | 51 | 53 | 54 | 54 | 7% |
| ENERGY[8] | 7 | 7 | 7 | 7 | 7 | 7 | 0% |
| TOTALS | 86 | 95 | 116 | 124 | 130 | 134 | 9.6% |

[1]Does not include 14 local air program positions.

[2]Does not include local law enforcement personnel who devote some time to noise matters.

[3]Does not include training personnel nor approximately 3,000 commercial applicators and 40,000 farmers who may be certified.

[4]Does not include an estimated 1,500 water supply personnel.

[5]Does not include health safety officers nor private sector personnel.

[6]Does not include an estimated 100 position-equivalents employed in local disposal operations.

[7]Does not include 11 positions in the Agricultural Pollution Control Division nor that portion of the Natural Resources Commission staff active in water pollution matters. Also not included are an estimated 500 wastewater plant operators.

[8]Includes only State Energy Office position. Some growth may occur but cannot be accurately predicted at this time.

## EDUCATION

Nebraska higher education institutions have not yet developed environmentally-related education programs in wide varieties or large numbers. This lack of development can perhaps be attributed to the fact that Nebraska's environmental problems are not as critical as those of other states.

A number of two-year institutions are beginning to move into the environmental field. The following are examples of some programs: Central Technical Community College in Environmental Technology and Ag-Chemical Technology; Northeast Technical Community College and Southeast Community College in Environmental Technology and Agricultural Chemicals.

At the four-year level Chadron State College has cooperated in operator training courses and is attempting to establish a Center for Environmental, Historical, and Multi-Cultural Background Studies. The University of Nebraska has programs in Environmental Health and Sanitary Engineering.

## LEGISLATION

The environmental/energy legislation for Nebraska was obtained by request from various agency personnel and through various library references. Summaries of the legislation deemed most relevant to the eight subject areas of the workforce assessment were prepared, and are included in the respective state reports. The following list of laws represents virtually all environmental legislation for the state. Only certain of the following laws were summarized; the list is presented to show, by title, the kinds of laws which have been enacted.

Environmental Protection Act of 1971

Control of Smoke Emissions and Noise Law

Pesticide Applicator Law

Safe Drinking Water Act

Radiation Control Act

Groundwater Well Irrigation Law

# National Environmental Energy Workforce Assessment

## Phase I

# NEBRASKA

## State Report

13

## STATE PROFILE

Nebraska is located in the west central plains area of the United States in an area which originally was important only as a land and water route to northern and western parts of the nation. But the advent of the railroad opened Nebraska to more people and in 1867 it became a state. The current population of 1,533,000 makes Nebraska sparsely populated; this low-density in population is accentuated by the fact that a majority of the people live close to the Missouri and Platte Rivers.

The development of the railroad system was crucial to the settlement of interior Nebraska. Coupled with the river system, the railroads gave the state a transportation system which keyed its economic expansion. Cattle from the western ranges and crops from eastern farms could be marketed easily and efficiently.

Nebraska has rightfully attained a position as one of the nation's leading agricultural states. While only one-fifth of its workforce is employed directly in farming or ranching, the state is dependent on many agriculturally-related enterprises. Principal crops in which Nebraska ranks in the top five nationally include corn, hay, wheat, sorghum, and sugar beets. In livestock produced, Nebraska ranks third in cattle and sixth in hogs and pigs.

Nebraska's mineral and energy resources are limited and output declined sharply during the 1960s. Crude petroleum accounts for approximately one-half of the state's mineral extraction, but

significant amounts of natural gas, cement, lime, pumice and sand are produced. Nebraska must import most of its energy resources.

Insurance, particularly in Omaha, has developed into a major business of the state. Other leading industrial activities include machinery, chemicals, printing and publishing, and transportation equipment.

Nebraska is composed of two main physiographic regions, the till plains of the Central Lowland in the eastern third and the Great Plains in the west. The Missouri River along the state's eastern border and the Platte River through the center of the state are key transportation and water resources. The landscape varies from gently rolling prairie to flatlands in south central and panhandle regions. The Sand Hills country of north central and northwestern Nebraska is a vast, treeless, grass-covered region comprising almost one-fourth of the state. The combination of luxuriant grasses and small lakes has made the Sand Hills one of the best rangelands in the United States.

Nebraska is predominantly a rural state with Omaha and Lincoln the only large cities; however, the decline in the rural population is taking place in the state just as it is in other parts of the country. The population center has moved steadily eastward as Omaha and nearby cities have gained in population. Urban growth can be expected to continue as agricultural mechanization develops and more industry enters the state.

The most unique feature of the Nebraska state government is its one-house legislature known as the Unicameral. Legislators are

elected without political party affiliation and it is the only such legislative body in the nation. One result of this nonpartisan feature is that electoral campaigns are more likely to be decided on the basis of local issues rather than on party loyalties.

While Nebraska is not likely to be plagued by the myriad environmental problems facing industrialized states, it will have many concerns which are just as pressing. Agricultural pollution of the state's waterways will have to be avoided, precious land resources must be conserved, and energy demands for agricultural production will continue. Increased urbanization and more industries are likely to cause a need for environmental action in these areas also. But Nebraska's closeness to the land, in spirit as well as in economic and geographic fact, is likely to be maintained.

## NEBRASKA POLLUTION CONTROL AND ABATEMENT AGENCIES

There are six Nebraska state agencies with major involvement in pollution control and abatement and energy programs. The most important agency in terms of workforce and programs is the Department of Environmental Control. Other agencies involved include the Department of Health, the Department of Agriculture, the Natural Resources Commission, the Department of Water Resources, and the Department of Revenue (Energy).

The main office of the Nebraska Department of Environmental Control (Nebraska DEC) is located at the state capital in Lincoln; in addition there is a small contingent at North Platte. Nebraska DEC is subdivided into four divisions: Water Pollution Control Division, Agricultural Pollution Control Division, Air Pollution Control Division, and Solid Waste Pollution Control Division.

Most administrative activities of Nebraska DEC are carried out by a section which includes the Director, Grants Administration, Accounting, Personnel, Legal Counsel, and Public Information. The Environmental Control Council created concurrently with DEC, operates in conjunction with DEC and has the responsibility for adopting and promulgating environmental rules and regulations.

As of October 1976, Nebraska DEC was staffed by 75 full-time, permanent employees; there were an additional six CETA and one temporary positions. Of the 82 total employees, 75 were located in Lincoln and seven were in North Platte. DEC has grown steadily

since its creation in July 1971, when there was a staff of only 16 persons. Most growth has been due to major federal and state legislation, and rapid expansion as occurred in the first five years is not expected to continue.

The Nebraska Department of Health is responsible for pollution control and abatement activities in the areas of potable water and radiation. The Division of Environmental Engineering and the Division of Radiological Health are both located within the Bureau of Community Health Services. As of October 1976, there were twelve persons involved in public water programs; this total included lab personnel. The Division of Radiological Health was staffed by four professionals and one clerical person.

A third agency active in environmental areas is the Department of Agriculture which has state lead responsibility for pesticide programs. The Feed and Agricultural Chemical Division, within the Bureau of Plant Industry, currently devotes 3.5 positions to pesticide law and regulation enforcement.

The Nebraska Energy Office was established within the Department of Revenue in 1973 to carry out the state's energy allocation program. Currently most activity is devoted to conservation and research efforts. The office is staffed by six persons.

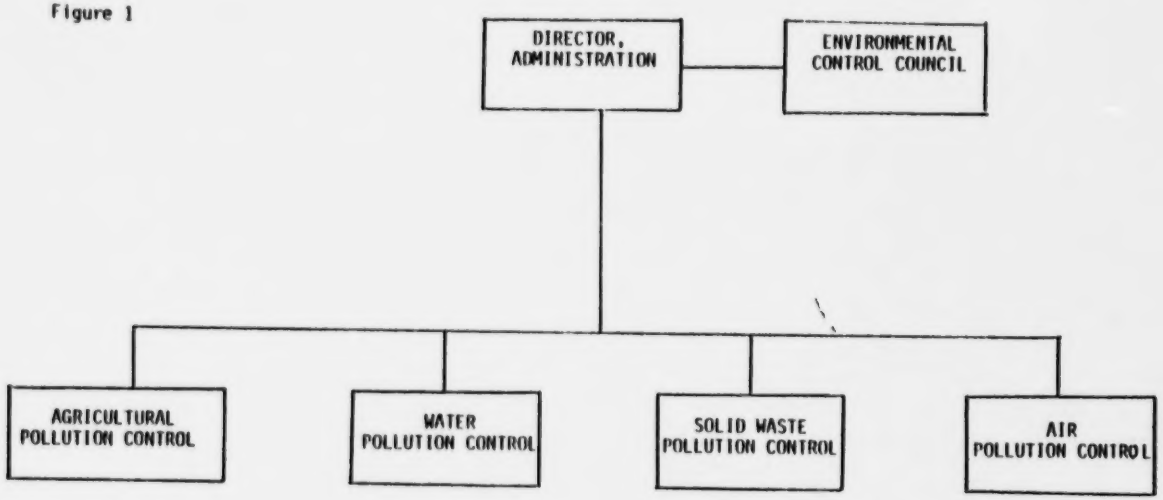
The Nebraska Natural Resources Commission, formerly the Nebraska Soil and Water Conservation Commission, is divided into Planning and Operations Divisions. Responsibilities of this agency concern Section 208 water quality planning, flood plain management, field surveys, and administration of various funding programs. In

addition, the Commission is in charge of the state's 24 natural resources districts and maintains a Natural Resources Data Bank. The Natural Resources Commission currently employs 63 persons including a significant number of engineers and engineering technicians.

Nebraska's final key pollution abatement agency is the Department of Water Resources. The Department is primarily a regulatory agency with limited pollution control responsibilities. Functions of the agency include determination and regulation of the use of water for irrigation, power, and other purposes. Other activities include stream sampling, registering of irrigation wells, and issuing permits for river channel construction. The Department is staffed by 30 permanent employees and approximately 10 temporary persons. A number of hydrographers and water resource technicians are included in this total.

DEPARTMENT OF ENVIRONMENTAL CONTROL

Figure 1



# Pollution Control and Abatement Programs

# I. AIR

## A. Introduction

Nebraska is more fortunate than many states in that it does not have a large number of pollution sources or acute pollution problems. Because of this, most of Nebraska's air pollution control efforts are directed at its few problems in populated areas and at preventing future air pollution.

The two significant air pollution problems in Nebraska concern motor vehicle emissions and suspended particulate matter. Automobile emissions, especially carbon monoxide and especially in Lincoln, have been the cause for some concern recently. Continual monitoring with an eye toward reducing traffic activity has been undertaken to deal with the problem. Suspended particulates originated from industrial sources and from land in the form of dust. Because of dry weather over the last three years, wind erosion of the land has been significant. While this has not been a critical problem yet, occasional high concentrations of dust have presented some air pollution problems. Unfortunately, there is little that can be done to control this form of pollution.

The Air Pollution Control Division of the Department of Environmental Control is the primary state agency dealing with air pollution problems. The Division is separated into an Engineering Section and a Surveillance and Enforcement Section. The Division maintains an air sampling and monitoring network throughout the state, and is responsible for administration of the Nebraska Air Quality

Implementation Plan. In addition, the Air Pollution Control Division must issue permits for potential new sources of air pollution and implement any emergency air pollution plans.

The State and local agencies operate 67 air samplers at 47 sites throughout Nebraska. Pollutants monitored include particulates, sulfur dioxide, nitrogen dioxide, carbon monoxide, and ozone. The following table shows monitoring information according to pollutant, monitoring method and responsible agency.

TABLE I

STATE OF NEBRASKA

Nebraska Air Sampling Stations

| Pollutant | Monitor Type | DEC* | Omaha | Lincoln |
|---|---|---|---|---|
| Particulate | High-volume | 20 | 11 | 10 |
| Sulfur Dioxide | 24-Hour Bubbler | 5 | 5 | 2 |
| | Continuous | | 1 | |
| Nitrogen Dioxide | 24-Hour Bubbler | 1 | 5 | 1 |
| | Continuous | | 1 | |
| Carbon Monoxide | Continuous | 2 | 1 | |
| Ozone | Continuous | | 2 | |
| TOTAL | | 28 | 26 | 13 |

*Department of Environmental Control

To prevent deterioration of air quality and to ensure that ambient air quality standards, once met, are maintained, a program for review of potential air pollution sources and a permit/variance program have been instituted.

Three local agencies are also involved in air quality monitoring and surveillance; two county efforts are the Air Pollution Control Section of the Lincoln-Lancaster County Department of Environmental Health and the Environmental Health Division of the Omaha-Douglas County Health Department. The Air Quality Control Section of the Omaha Permits and Inspection Division has enforcement authority for local air pollution matters.

Major activities of the Omaha Air Quality Section include inspection of major pollution sources, permit issuance for pollution control equipment, and registration of new points of emissions. The Omaha-Douglas County Health Department engages primarily in monitoring activity and laboratory analysis. Functions of the Lincoln-Lancaster County Air Pollution Control Section are similar to those of the Omaha Air Quality Section: source inspections, air monitoring, plan review and permit issuance. The Air Pollution Control Division of DEC has responsibility for coordinating activities of and providing assistance to these local agencies.

B. Workforce Profile

Activities of the Nebraska Air Pollution Control Division center around the State Air Quality Implementation Plan, particularly in achieving EPA-mandated ambient air quality standards. To carry out these and other activities, the Division is divided into sections on Engineering and on Surveillance and Enforcement. The Division is staffed by twelve persons; eleven of these are in the Lincoln office and one is in the North Platte office. The distribution of Division

personnel, by occupational category, is shown is the following table.

TABLE II

NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Air Pollution Control Division
Current (1976) Staffing Level

| Position | 1976 |
|---|---|
| Engineer | 3 |
| Scientist | 6 |
| Meteorologist | 1 |
| Technician | 1 |
| Clerical | 1 |
| TOTAL | 12 |

The three engineer positions include the Division Chief who is a civil engineer and a chemical and mechanical engineer. The scientists are degreed persons in biology and chemistry. The technician is involved primarily in monitoring activity. The meteorologist position is currently vacant.

Except for the Division Chief and the Clerical, all positions are classified as either Environmental Engineers or Environmental Specialists. The Engineers have primary responsibility for establishing ambient air quality standards, drafting emission-limitation regulations, approving new source plans, and issuing necessary permits. The Specialists' main role is in compliance monitoring to assure compliance with air quality standards in areas not covered by a local agency.

As provided for in the Clean Air Act, Nebraska has been divided into four Air Quality Control Regions (AQCR); these are the Omaha-Council Bluffs Interstate Region, the Lincoln-Beatrice-Fairbury Intrastate Region, the Sioux City Interstate Region, and the Nebraska

Intrastate Region comprising the balance of the state. While the Nebraska DEC has the ultimate responsibility for the attainment of ambient air quality standards throughout the state, three local agencies are also involved in air pollution control activities.

The City of Omaha Air Quality Control Section employs a staff of six persons, half of whom are designated as inspectors. Part-time personnel and staff support from other sections raise this total to sixteen person-years during a twelve-month period. The Omaha-Douglas County Health Department employs three technicians who perform air monitoring and laboratory activities. The third agency, the Air Pollution Control Section of the Lincoln-Lancaster County Health Department, has a staff of five full-time persons with significant part-time support. A total staff of approximately fourteen full-time people staff local air pollution program efforts. The distribution of these positions is shown in the following table.

TABLE III

Local Air Pollution Control Programs
Current (1976) Staffing Level

| Position | 1976 |
|---|---|
| Administrator | 2 |
| Engineer | 3 |
| Inspector | 5 |
| Sanitarian | 1 |
| Lab Technician | 1 |
| Clerical | 1 |
| Equipment Technician | 1 |
| TOTAL | 14 |

Engineers in the local agencies generally have training in air pollution, sanitation or chemical fields. The Administrators noted have technical backgrounds. In addition, two of the inspectors are engineers and the other three are either sanitarians or environmental specialists.

As noted the City of Omaha Air Quality Control Section receives sufficient part-time and non-Section staff support to raise its effective personnel force to sixteen persons. The same is true for the Air Pollution Control Section of the Lincoln-Lancaster County Health Department. Program Support is provided in the administrative, legal, data processing, laboratory, public information and clerical areas.

Hiring and recruiting for positions in Nebraska DEC is generally conducted by the Administrative Services Department of Personnel. At the city and county level most hiring is also done through a personnel department. Because of the specialized nature of many positions, recruiting from similar agencies or specialized educational institutions is often necessary. For these same reasons, a great deal of on-the-job training, discussed in another section of this report, is conducted by the individual agencies.

C. Workforce Projections

Future workforce needs and projections are based on professional estimates of persons active in the air pollution control fields.

Making five-year projections can be fairly speculative and will depend, in many cases, on actions beyond an agency's control.

Because Nebraska is basically a rural state with few widespread pollution problems, the DEC Air Pollution Control Division does not anticipate any staff growth in the near future. A great deal of the initial start-up work required under the State Implementation Plan has been accomplished, and it is felt that the present staff will be adequate for the next five years.

TABLE IV

NEBRASKA DEPARTMENT OF ENVIRONMENTAL QUALITY
Air Pollution Control Division
Workforce Projections to 1982 (est.)

| Position | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | Average %/annum turnover | Average %/annum growth |
|---|---|---|---|---|---|---|---|---|
| Engineer | 3 | 3 | 3 | 3 | 3 | 3 | n/a | 0% |
| Scientist | 6 | 6 | 6 | 6 | 6 | 6 | n/a | 0% |
| Meteorologist | 1 | 1 | 1 | 1 | 1 | 1 | n/a | 0% |
| Technician | 1 | 1 | 1 | 1 | 1 | 1 | n/a | 0% |
| Clerical | 1 | 1 | 1 | 1 | 1 | 1 | n/a | 0% |
| TOTAL | 12 | 12 | 12 | 12 | 12 | 12 | | |

The staff has grown from only four persons in 1971 and is now sufficient for present needs. Turnover for the entire Department may average 15% to 20% annually in professional positions, and the Division is representative of the Department in this category. As previously indicated, the meteorologist position is currently vacant.

Similar estimates concerning staff growth were made by the local air pollution control agencies. The Lincoln-Lancaster County Air Pollution Control Section has had a staff of five full-time employees since 1973 and does not anticipate any future expansion. All

anticipated programs are presently operational and, according to professional judgments, adequately staffed. The agency has experienced no turnover in recent years.

The City of Omaha Air Quality Section also does not foresee any staff expansion. Until 1973 only one person was involved with air permit issuance; more poeple were added at that time as state air quality standards were developed and more monitoring was necessitated. Out of a staff of six full-time persons, there has been turnover in two positions during 1975-76. The Douglas County Health Department has also experienced turnover in two air pollution positions in the same period.

D. Training and Certification

The use of air pollution control and monitoring equipment necessitates a great deal of technical expertise. It has been found at the state and local level that obtaining such expertise generally involves at least some on-the-job training.

For the DEC Air Pollution Control Division, specialized job roles and equipment lead to a great deal of OJT; this is especially true in non-engineer positions. Staff members regularly attended air pollution training sessions conducted by the U.S. Environmental Protection Agency. An effort is made to send new employees to such sessions twice per year during their first two years. The Division also conducts a smoke-reading school every six months for its own personnel and for other public and private sector people.

The Omaha Air Quality Control Section requires its inspectors to be recertified in smoke-reading every six months. The Section also sends employees to EPA-sponsored training sessions as the budget allows and as deemed relevant to the job.

The Lincoln-Lancaster County Air Pollution Control Section also participates in smoke-reading schools and requires recertification of inspectors every six months. Staff members involved with air monitoring equipment operation are trained in these matters on the job.

E. Career Potential

The projections for little workforce growth combined with very little turnover mean that career opportunities in the air pollution field in Nebraska will be extremely limited over the next five years. This field, like many others, may experience a tendency to become more technical, and any openings which do occur are likely to be for highly-trained or experienced persons. Pollution control equipment can be expected to be more prevalent and more complex; operators and maintenance personnel must be well-trained.

Two factors were cited by DEC personnel which may provide careers and staff growth beyond that noted above. EPA regulations concerned with deterioration of air quality beyond its present conditions may cause more stringent emissions limitations, even though most air in the state is relatively unpolluted. Similar regulations may require that certain areas be cleaned up or restored to prior air quality conditions.

The possible limitation on the sale or use of aerosol propellants may also affect air pollution workforce trends. Action in this area will, of course, depend on what is done at the state or federal level and what obligations are consequently imposed on the Air Pollution Control Division.

Local air agencies, projecting little if any staff growth, strengthen the probability that public sector opportunities will be limited. Concern over increasing motor vehicle emissions was expressed, however, and it is possible that future staff openings may be filled by people with expertise in this area.

F. Conclusion

Most air pollution control positions are staffed by engineers, sanitarians, technicians, and other highly-skilled persons. Few expansion opportunities are likely in the public sector as it is felt that most program activities are being carried out adequately at the present time.

The ability to fill vacant positions has generally not been a problem, although retention of upper-level professionals is often hampered by budget limitations. The large amounts of on-the-job training could perhaps be reduced through more formal technical training opportunities. Because of job-relatedness needs, OJT and EPA-conducted sessions will continue to be utilized to a great extent.

## II. NOISE

### A. Introduction

There is only one minor Nebraska statute concerning noise; this is a 1972 law relating to noise emissions by heavy-duty motor vehicles. At the state level, the noise law is to be enforced by the Division of Air Pollution Control within the Department of Environmental Control. Because of the nature of noise, most actual enforcement activity must be undertaken at the local level. In addition, a number of local ordinances have been enacted in an attempt to control noise emissions.

### B. Workforce Profile

Very little data on workforce levels in the noise area are available; it appears that the number of people employed in this field is minimal. Two persons in the Division of Air Pollution Control monitor heavy-duty motor vehicle emissions one or two days per month. The Division chief deals with matters which arise under the 1972 law, but such action involves a very small percentage of his time.

Six cities in Nebraska have enacted some form of noise control ordinance. These cities are Beatrice, Lincoln, McCook, Omaha, Scottsbluff and Sidney. The coverage of these ordinances is shown in the following table, adapted from Sound and Vibration, December, 1975.

TABLE V

STATE OF NEBRASKA

Municipal Noise Ordinances (1975)

| City | Nuisance | Zoning | Vehicle | Rec. Vehicle | Railroad | Aircraft | Construction | Bldg. |
|---|---|---|---|---|---|---|---|---|
| Beatrice | 0 | - | - | - | - | - | - | - |
| Lincoln | - | - | X | - | - | - | - | - |
| McCook | 0 | X | X | - | X | - | - | - |
| Omaha | 0 | - | 0 | - | - | - | 0 | - |
| Scottsbluff | 0 | - | 0 | - | - | - | 0 | 0 |
| Sidney | 0 | - | 0 | - | - | - | - | - |

Key: X Regulations include acoustical criteria
0 Regulations do not include acoustical criteria
- No regulations

The ordinances are enforced by local law enforcement personnel concurrent with other duties. No estimates were available on the actual number of persons involved in this activity.

Basically the Nebraska noise control law prohibits the sale or operation of motor vehicles over 10,000 pounds which emit greater than 86 dB (A) at thirty-five miles per hour and 90 dB (A) at greater than thirty-five miles per hour. Carefully defined measurement techniques must be followed in establishing noise levels, but the number of persons involved in this activity is not known.

C. Workforce Projections

The Division of Air Pollution Control expects little change in its staffing level for noise or air programs. Depending on enforcement efforts, little growth can be expected at the local level either. These projections could, of course, change radically if new state or federal

noise legislation is passed. Environmental noise pollution is a field that is still in its infancy, and as professional areas become more defined some growth may evolve.

Factors likely to influence workforce growth include an expanding role for states in consumer product noise, as set forth in present federal legislation, and greater noise pollution from advancing technology.

D. Training and Certification

At present no training and certification is conducted in the noise field. As the use of more sophisticated noise monitoring equipment expands, some technical job-related training is likely to be developed.

E. Career Potential

The limited present workforce and the uncertain, but minimal expansion, indicate few career prospects in the next five years. Some technical and equipment-use categories may be developing by the early 1980s.

F. Conclusion

There is presently little environmental noise activity in Nebraska. Potentially greater control of consumer products and all types of motor vehicles could expand noise control measures, but even these possibilities could have little impact in a sparsely-populated state such as Nebraska. Limited training opportunities would need to be expanded if growth does occur in this area.

## III. PESTICIDES

### A. Introduction

The Nebraska Department of Agriculture is the state lead agency for pesticide program activities. The Feed and Agricultural Chemical Division within the Department's Bureau of Plant Industry is charged with enforcing the Economic Poison Law and the Pesticide Applicator Law, the state's primary pesticide legislation. In addition, the Department of Aeronautics certifies aerial pesticide applicators under the Aerial Applicators Law.

The Pesticide Applicator Law was enacted in 1976 as a response to federally mandated pesticide use restrictions. Under the law the Cooperative Extension Service of the University of Nebraska is required to conduct training sessions on the use of restricted use pesticides; the Department of Agriculture then issues certificates to private applicators. Commercial applicators are certified following training and examination.

Recently the Division and other sections of the Department of Agriculture have had an additional environmental function. Working with the Department of Environmental Control, the Division has provided assistance in preparing regulations on water and land pollution as they are affected by pesticides. Disposal problems of pesticide containers has recently been handled in this manner.

B. Workforce Profile

The Feed and Agricultural Chemical Division has a staff of four persons involved in the pesticides field. This staff is composed of one administrator, two agricultural specialists and one clerical. Additionally, eight inspectors are employed by the Bureau of Plant Industry, each being involved in pesticides to a limited extent; the role of the inspectors constitutes an equivalent of approximately two staff positions.

Other pesticide program workforce support comes from the Department of Agriculture laboratories where it is estimated that two people are engaged in pesticide analysis activities. The University of Nebraska Extension Service has been assigned the responsibility for training pesticide applicators as mandated by federal law. The Extension Service has hired one education coordinator to conduct the applicator training.

Division personnel estimate that 3,000 commercial applicators and as many as 40,000 farmers may be certified for restricted use pesticides. These figures represent a substantial portion of Nebraska's 68,000 farmers. Current plans call for County Agents to provide training to farmers and for Area Specialists to assist in training commercial applicators, all under the supervision of the University Extension Service. The Department of Agriculture will administer examinations to those persons for whom it is required.

The total pesticide workforce level for Nebraska is shown in the following table; some figures are estimates and others represent equivalent positions from a greater number of part-time personnel.

TABLE VI

Current (1976) Nebraska Pesticide Staffing Levels for Public and Private Sectors (est.)

| Public Sector | 1976 |
|---|---|
| Administrator | 1 |
| Agriculture Specialist | 2 |
| Chemist | 2 |
| Inspector | 2 |
| State Extension Educator | 1 |
| Training Assistant | 15 |
| TOTAL | 23 |

| Private Sector | |
|---|---|
| Farmers | 40,000 |
| Commercial Applicators | 3,000 |
| TOTAL | 43,000 |

The administrator and two Agriculture Specialists shown in the above Table are employed in the Feed and Agricultural Chemical Division of the Department of Agriculture. All three have graduate degrees in either animal science, agronomy or agricultural education. The chemists noted are engaged in laboratory analysis work. The training assistant category is an equivalency figure of County Agents and Area Specialists who may only be involved in training on a part-time basis.

As is evident from the Table, the 1972 amendments to the Federal Insecticide, Fungicide, and Rodenticide Act, as they relate to applicator certification, have had a major impact on the private sector of pesticide use and control. It is anticipated that the bulk of the private sector personnel noted in the Table will be certified by October 1977.

C. Workforce Projections

Information on workforce projections requires the making of professional estimates; these estimates can only be accurate insofar as certain assumptions are borne out or various contingencies are realized. Projections shown herein, as well as those concerning private sector applicators, were made by personnel of the Feed and Agricultural Chemical Division of the Department of Agriculture.

It is felt that the Division is adequately staffed at the present time; however, two additional inspectors may be needed for pesticide registration and use monitoring. Depending on the workload created by applicator certification procedures, another professional staff person may be needed in the Lincoln office. Potential staff growth over the next five years is shown on the following Table.

TABLE VII

DEPARTMENT OF AGRICULTURE

Nebraska Pesticides Staffing Level
Workforce Projections to 1982 (est.)

| Position | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | average %/annum turnover | %/annum growth |
|---|---|---|---|---|---|---|---|---|
| Administrator | 1 | 1 | 1 | 1 | 1 | 1 | n/a | 0% |
| Ag Specialist | 2 | 2 | 3 | 3 | 3 | 3 | n/a | 10% |
| Inspector | 2 | 3 | 4 | 4 | 4 | 4 | n/a | 18% |
| Clerical | 1 | 1 | 1 | 1 | 1 | 1 | n/a | 0% |
| TOTAL | 6 | 7 | 9 | 9 | 9 | 9 | | 9% |

Apparently staff growth in the pesticides public sector will be extremely limited over the next five years. A potential growth area is for inspectors, people who generally have an agriculture degree or agriculture experience. Other factors which may affect staff growth

include a role in pesticide accident investigations and the need to do more on-site enforcement activity. Either of these functions would expand the workforce needs.

No growth rate estimates were made for commercial and private pesticide applicators. It is felt, however, that approximately 90% of those who will eventually need certification will be certified by October 1977. A limited growth rate for applicators is suggested, with new designations of restricted use pesticides perhaps being the most signifcant factor.

Turnover in the public sector has been negligible in recent years. The workforce is generally very stable, with most changes resulting from a change in Department directors.

D. Training and Certification

The Department of Agriculture and the University of Nebraska Cooperative Extension Service are jointly undertaking commercial and private applicator training. The Extension Service has hired an educational coordinator to direct the training program. He will be assisted by County Agents and Area Specialists in actually reaching the estimated 43,000 persons to be certified.

Approximately 90 County Agents are committing part-time efforts to training farmers and other private applicators. Much of this training is done on a one-to-one basis in Nebraska's 93 counties with significantly more training taking place in winter months. Fifteen Area Specialists are providing training to commercial applicators; this training is generally in groups and provides more in-depth information than the private applicator sessions.

The Department of Agriculture has established eleven categories in which commercial applicators can be certified: agricultural pest control-plant, agricultural pest control-animal, forest pest control, ornamental and turf pest control, seed treatment, aquatic pest control, right-of-way pest control, industrial-institutional-structural pest control, public health pest control, regulatory pest control, and demonstration and research pest control. Approximately 1,000 commercial applicators and nearly 40,000 private applicators have received training. The certification process is currently being implemented.

E. Career Potential

The projected slow growth in public sector employment indicates relatively few career opportunities in this area. Inspectors with a strong agricultural background are the category most likely to fill any openings.

While little information is available, some growth in the number of commercial applicators can be expected. Growth should result from a labor trend to determine the necessary workforce supply, and from increasing sophistication of chemicals and application methods. Opportunities in the applicator and advisor field are likely to be of a technical nature, with training in chemistry and agronomy to be most beneficial.

F. Conclusion

Employment in Nebraska's public sector pesticide programs appears to be fairly stable at the present time. Some growth can be expected in the commercial applicator and advisor area as the full impact of pesticide use restrictions are felt. Disposal of pesticides and pesticide containers and pesticide accident investigation are two areas of possible expanded public sector involvement. Career opportunities may arise in these areas as programs are developed.

Continued demands to produce greater crop yields from limited land resources is likely to lead to greater pesticides need and use. On the other hand, potential pesticide run-off and water pollution is likely to lead to more stringent controls on pesticide use. One likely result of these two forces is that the pesticides field will become a more technical one with greater emphasis on research and alternatives such as integrated pest management.

## IV. POTABLE WATER

### A. Introduction

Regulatory and enforcement activity of Nebraska's potable water supplies is primarily the responsibility of the Division of Environmental Engineering within the Department of Health. In 1976 the Nebraska Safe Drinking Water Act became law and is the primary enforcement tool of the Division. The Act greatly expanded the water supply program and added more regulatory authority.

Under current legislation the Division must establish minimum drinking water standards, approve water supply system construction or alteration, issue permits to public water supply systems, and certify public water supply system operators. Other activities of the Division include formal training of water works personnel, participation in regional water resource planning, and administering a portion of the state swimming pool law. Two key functions involving significant workforce commitment are inspection of all water supplies and the provision of assistance to local governmental units in the replacement, operation and maintenance of facilities.

The Department of Water Resources has an ancillary role in the water supply field. The Department has a regulatory function with little enforcement authority in the rights and uses of ground and stream water. Stream gauging, quality sampling and irrigation well registration are within the purview of Water Resources.

The Division of Environmental Engineering monitors a total of 708 community-type water supply systems; 532 of these supply municipalities, 144 supply subdivisions and trailer courts, and the remainder are operated by Sanitary Improvement Districts and Rural Water Districts. Assistance in inspecting this large number of sources has been provided by the Division of Housing and Environmental Health and the Department of Agriculture in the past.

The State Safe Drinking Water Act imposes an obligation on the Department of Health and the Division of Environmental Engineering to classify all public water supply systems into one of four categories. These categories are based on treatment method and population served, and all facilities must be issued a permit by January 1, 1978. Concomitant with this classification effort is an operator training and certification program discussed more fully in that subsection.

B. Workforce Profile

The potable water supply program and administration of the Nebraska Safe Drinking Water Act is carried out by the personnel of the Division of Environmental Engineering. The Division has a staff of ten people, all located in the Lincoln offices of the Department of Health. The distribution of the staff, by position, is shown in the following table.

TABLE VIII

NEBRASKA DEPARTMENT OF HEALTH

Division of Environmental Engineering
Current (1976) Staffing Level

| Position | 1976 |
|---|---|
| Engineer | 4 |
| Technician | 2 |
| Geologist | 1 |
| Administrator | 1 |
| Clerical | 2 |
| TOTAL | 10 |

Most of the engineers are trained in civil engineering. The technicians are actually classified as engineer aides. While the Division does not have any life scientists on its staff, assistance in this area is provided by Department of Health laboratory personnel. In addition, the Division has field staff personnel of one engineer and four technicians.

The Department of Health Laboratories provide back-up and support services in water analysis and sampling. While the labs are used by numerous state agencies, an equivalent of two persons spend most of their time on water supply matters. Professional training of laboratory personnel is in the areas of chemistry and bacteriology.

Two positions classified as water supply specialist are currently vacant; these positions will likely be filled by engineers or by persons with water supply experience. There are no other vacancies in the Division at the present time.

The Department of Water Resources is currently staffed by thirty permanent and temporary employees, fifteen of whom are located in the Lincoln office. The staff is composed primarily of hydrographers and

water resource measurement technicians, positions requiring a two-year college degree. The Department also employs four professional engineers. Because the Department of Water Resources is not extensively involved in the potable water field, its staff and workforce needs will not be analyzed in depth here.

Operator certification under the 1976 Safe Drinking Water Act will not be mandatory until January 1, 1979. The Nebraska section of the American Water Works Association (AWWA) has sponsored a voluntary Water Operator Certification Program for several years. Approximately 250 operators have been certified under this voluntary program although no data is available on the number in each classification. Grade I is the highest classification and Grade IV is the lowest; it is estimated that most of the 250 operators are in Grade IV. There may be as many as 1,500 operators currently active in the water supply field who will eventually require certification.

C. Workforce Projections

Workforce projections are, of course, based on best professional judgments. Budget limitations and potential legislation are the two primary factors which may affect these projections, but there is reason to believe that these two variables may be more stable in the potable water area than in other fields.

Safe Drinking Water Act mandates and surveillance requirements suggest that the workforce level for the Division of Environmental Engineering may reach 27 in the next five years. The potential growth by category is set forth in the following table.

TABLE IX

NEBRASKA DEPARTMENT OF HEALTH

Division of Environmental Engineering
Workforce Projections to 1982 (est.)

| Position | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | %/annum turnover (average) | %/annum growth (average) |
|---|---|---|---|---|---|---|---|---|
| Engineer | 4 | 5 | 7 | 9 | 11 | 13 | n/a | 27% |
| Technician | 2 | 2 | 4 | 4 | 5 | 5 | n/a | 25% |
| Scientist | 1 | 1 | 2 | 3 | 4 | 5 | n/a | 42% |
| Administrator | 1 | 1 | 2 | 2 | 2 | 2 | n/a | 20% |
| Clerical | 2 | 2 | 2 | 2 | 2 | 2 | n/a | 0 |
| TOTAL | 10 | 11 | 17 | 20 | 24 | 27 | | 23% |

Growth potential appears to be strongest in the highly-skilled fields such as engineers and scientists. This reflects both an increasing need for these kinds of services and a shortage of life scientists in the Division at the present time. The Division grew from four professionals in 1974 to its 1976 level through the addition of three engineers, one geologist and one technician. Indications are that this is the type of growth which will continue.

The number of certified treatment facility operators is expected to increase from 250 (under a voluntary program) to 1,500 in classifications established by the Department of Health. However, there will not be an increase of 1,250 operators as most of these people are employed in that capacity. It is felt that most of the 500 community water supplies in Nebraska are adequately staffed, and only limited growth in numbers of operators beyond the 1,500 level is expected.

At present no breakdown of certified operators by classification is available, but it is likely that most are at the Grade IV level. Under the Safe Drinking Water Act requirements, there will undoubtedly

be a significant increase in higher grade categories, particularly to Grades II and III.

More stringent water supply sampling and analysis under the new legislation from a far greater number of sources may increase the laboratory support needed by the Division. No growth projections in this field can be made at this time.

D. Training and Certification

As noted previously, the most important training and certification activity will be for water supply operators under the state Safe Drinking Water Act. Operators of all public water supply systems must be certified by January 1, 1979. Classifications are to be established based on treatment method used and population served. It is anticipated that the four grades established by AWWA will serve as a guide with a possible fifth category for small systems serving less than 100 consumers.

The Division of Environmental Engineering is coordinating operator training activities through Nebraska community colleges. One staff engineer has been devoting much of his time to training coordination and materials. Operators and applicants who receive training will then take an examination to determine competency. It is possible that current water supply operators can be certified without examination based on "performance competency".

Upgrade training for present Division personnel is important for maintaining a highly-qualified staff. Several people have attended the water and wastewater school at Neosho, Missouri, in

courses ranging from two weeks to nine months. Training from the Neosho school is also highly-regarded for possible new employees as it reduces the amount of on-the-job training required. Other upgrade possibilities include a well-design course in Wisconsin and tuition assistance for job-related courses at the University of Nebraska.

The workforce projections show a need for engineers and technicians. While there are numerous opportunities for engineering education, some concern was expressed over specialties in water and water supply areas. Training options for these courses may need to be re-examined.

E. Career Potential

The increased emphasis on water supply quality and the need for certified operators indicate increasing career potential in the potable water field. An undetermined need in laboratory specialists should increase growth in this area.

Enforcement of primary drinking water standards through surveillance and sampling, coupled with training and certification of operators are, and will continue to be, major career needs within the Division. Engineers and other highly-skilled personnel will have an expanding role in design, approval and construction of public water supply systems.

The number of water supply operators is likely to increase very little, but more sophistication in facilities is likely as standards are established. As a result, career opportunities may expand in the maintenance and support categories.

F. Conclusion

Marked staff growth in the major state potable water agency is likely over the next five years as the Safe Drinking Water Act is fully implemented. Mandatory certification of water supply operators will improve water quality but will require increased personnel at the state level. Engineers, technicians and scientists have been and will continue to be the most needed professional categories at the state level. Upgrade training and community college courses for technicians and operators will greatly assist in filling water supply workforce needs.

## V. RADIATION

### A. Introduction

The primary agency in Nebraska charged with radiation control responsibility is the Division of Radiological Health within the Department of Health. The Radiation Advisory Council is a nine-member board of professionals which advises the Division on policies and procedures. Representatives from the fields of radiology, medicine, health physics, law, agriculture, industry, dentistry, and chiropractic, osteopathy or podiatry serve on the Council. Both the Division and the Council were created by the Radiation Control Act in 1963.

The Act was significantly revised in 1975, particularly with regard to non-ionizing radiation sources. The legislation mandates the Division of Radiological Health to coordinate radiation control activities among all state agencies and to develop policies and regulations concerning the production, use storage and disposal of radiation sources. In addition the Division must survey radioactivity in air, water, food and other materials. A registration program is required for all radiation sources except radioactive materials which require a general or specific license.

The Division conducts surveys and inspections of radiation sources to minimize worker and public exposure hazards, and to permit the maximum utilization of radiation sources consistent with public health and safety. Nebraska, as a Nuclear Regulatory Agreement State, has assumed certain duties previously performed by the federal government.

B. Workforce Profile

The Division of Radiological Health is composed of a staff of five persons to carry out its functions; the entire staff is located in the Lincoln office. The staffing of the Division by position is shown on the following table.

TABLE X

NEBRASKA DEPARTMENT OF HEALTH

Division of Radiological Health
Current (1976) Staffing Level

| Position | 1976 |
|---|---|
| Radiological Health Specialist | 3 |
| Administrator | 1 |
| Clerical | 1 |
| TOTAL | 5 |

The Radiological Health Specialists are degreed persons in either chemistry or physics. The Administrator, who is also the Division Director, has a Masters degree in Sanitary Science and Public Health, with a major in Radiological Health. All positions require a strong science and technical background. A radiological Health Specialist I generally engages in laboratory analysis activities and radiation monitoring; the higher classifications of this position review registration and license applications, develop regulations, conduct training and assist in policy making activities. One professional position is vacant.

As noted earlier, another workforce resource of the Division is the Radiation Advisory Council. While not technically a part of the radiation workforce, these highly-trained professionals do provide support services.

C. Workforce Projections

There are a number of variables which may affect the Nebraska radiation workforce in the coming years; such factors include more electronic radiation products, increased numbers of ionizing and non-ionizing radiation sources, and nuclear power plant materials. In any event, the Division of Radiological Health is likely to experience some workforce growth.

The following table shows projected workforce growth over the next five years.

TABLE XI

NEBRASKA DEPARTMENT OF HEALTH

Division of Radiological Health
Workforce Projections to 1982 (est.)

| Position | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | %/annum turnover (average) | %/annum growth (average) |
|---|---|---|---|---|---|---|---|---|
| Radiological Health Specialist | 3 | 4 | 4 | 5 | 5 | 6 | n/a | 16% |
| Administrator | 1 | 1 | 1 | 1 | 1 | 1 | n/a | 0 |
| Clerical | 1 | 1 | 1 | 1 | 1 | 1 | n/a | 0 |
| TOTAL | 5 | 6 | 6 | 7 | 7 | 8 | | 10% |

The projected growth shown in the above table is a continuation of Division expansion that began with original staffing in 1964. There were two persons on the original staff, but only one person remained in 1970. By 1975, the Division had grown to four positions, two less than its currently authorized level.

Nebraska currently has two nuclear power reactors operational and another one planned. The specific state role with regard to nuclear reactors and the possible assumption of some NRC activities could mean

workforce expansion greater than that projected in the Table. This is particularly true in view of the feeling that present staffing of the Division is not adequate.

Turnover of the Division's professional staff has been a significant and continuing problem. Four professionals left during 1975 and 1976, and the Division Chief is the only person who has been on the staff for more than three years. Non-competitive salaries were the major reason cited for the high rate of turnover. It is felt that because of beginning salaries current vacancies will probably have to be filled by technical school graduates in radiation technology.

D. Training and Certification

The radiation protection and control field is highly technical and has continual research findings and information. For this reason every effort is made to have staff members attend training activities. Over the past several years, a number of staff persons have attended the ten-week training course offered by Oak Ridge Associated Universities at Oak Ridge, Tennessee. Budget limitations have greatly curtailed recent attendance at the Oakridge training course.

Less formal training is occasionally provided by the Nuclear Regulatory Commission. A great deal of on-the-job training and in-house cross-training is a valuable supplement to other courses and to learning specific tasks. The staff itself provides expert advice and consultation to government, civic, educational, professional and other groups.

Qualifications for positions stress the need for physical or biological science training generally available from colleges. Community colleges have recently been offering radiation technology training.

E. Career Potential

New career opportunities are likely to be evolving in the radiation field in the 1980s. This is shown by the modest growth anticipated for the public sector and potential growth in the private sector due to more nuclear power facilities and more radiation-emitting consumer products.

It appears that job openings will be the greatest for highly trained persons in physics, health physics, and radiation health areas. Graduates from two-year technical schools in radiation technology and equipment use and maintenance are likely to be in demand. Because of expected growth and turnover of the Division of Radiological Health, career opportunities in Nebraska's public sector may well be greater than its size would indicate.

F. Conclusion

Expanding uses of and problems with radiation will lead to workforce needs in this area through 1982. Modest growth in the public sector and undetermined, but potential, growth in the private sector will help to meet these needs. Regulatory demands and budget constraints will have to be balanced as Nebraska's radiation protection program moves into the 1980s.

## VI. SOLID WASTE

### A. Introduction

Solid waste management and land pollution control are becoming increasingly important in environmental protection efforts. Greater affluence and material wealth has produced staggering quantities of solid waste; the Solid Waste Pollution Control Division of the Department of Environmental Control is the primary state agency for regulating disposal and land quality problems.

Functions and responsibilities of the Division include:

1) Development of a state solid waste management plan;
2) Issuance of guidelines for solid waste planning, storage, and collection;
3) Inspection and licensing of solid waste disposal sites;
4) Provision of technical assistance in resource recovery operations;
5) Elimination of indiscriminate disposal and open dumping;
6) Studies regarding hazardous waste management and disposal.

The Division is divided into a State Planning Section and a Surveillance and Enforcement Section. The Planning Section issues most solid waste guidelines, helps plan and approve solid waste facilities, and is active in the licensing process. The Surveillance and Enforcement Section inspects solid waste disposal areas and attempts to control open dumping and open burning prohibitions.

According to the 1973 Solid Waste Management Plan, Nebraska has approximately 400 disposal sites; of this number, 53 are licensed land disposal sites and nine are considered sanitary landfills. There are 17 sites in the state considered acceptable to receive hazardous wastes on a case-by-case basis. Based on a 1969 survey, there were 618 dumps in Nebraska; this decrease can be traced to joint community disposal sites and the use of transfer stations.

While sanitary landfills are increasingly becoming the most common disposal method, the 1973 Plan notes that 36 percent of the population is not served by a collection system and 90 percent of the sites that are in use are rated as sub-standard. It is apparent that for a state which generates over one million tons of solid waste annually, effective solid waste management is essential.

Existing state law requires the approval or licensing of new land disposal sites. However, prior to 1972 licensing requirements were also in effect for solid waste disposal areas of second-class cities and villages. This reduction in licensing requirements means that fewer than 10 percent of Nebraska's communities must provide proper management of solid waste disposal practices. As a result, the number of sub-standard sites has increased, uncontrolled burning is common at many sites, and there is a great deal of backyard burning because of inadequate or non-existent facilities.

B. Workforce Profile

The current staffing level of the DEC Solid Waste Pollution Control Division is seven persons. Six of these positions are located in the Lincoln office and one is in North Platte. A breakdown of these positions by occupational category is shown in the following table.

TABLE XII

NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Solid Waste Pollution Control Division
Current (1976) Staffing Level

| Position | 1976 |
|---|---|
| Engineer | 3 |
| Administrator | 1 |
| Environmental Specialist | 2 |
| Clerical | 1 |
| TOTAL | 7 |

The Division Chief has a large administrative role in his capacity. The three engineer positions breakdown as one chemical/sanitary, one mechanical, and one mining. As noted earlier, the environmental specialists are primarily responsible for surveillance and enforcement activities.

Turnover within the Division has been a minor problem, particularly with engineers. All of the engineers now on staff have been hired since 1974. The salary structure makes it difficult for public agencies to compete with the private sector for experienced engineers.

In addition to duties mentioned previously, the Division personnel provide technical assistance in resource recovery, undertake hazardous waste studies, and devote time to public affairs education and seminars for site operators.

The workforce employed by solid waste disposal facilities can be estimated on the basis of the 1973 Solid Waste Management Plan. The average workforce utilized is one full-time employee for every four sites; the approximate 400 operations employ an estimated 100 persons. It should be noted that larger cities may have several employees at a site, while smaller operations have a person at the site only a few hours per day or a few days per week.

C. Workforce Projections

Workforce projections information was acquired by interviews with personnel of the Solid Waste Pollution Control Division. These projections represent best professional judgements, in many cases based on significant financial and legislative variables.

The recently enacted Resource Conservation and Recovery Act of 1976 (Public Law 94-580), the need for more stringent state legislation, and expanding areas of waste concern add up to the potential for workforce growth in the solid waste field. Possible workforce projections, by occupational position, are shown on the following table.

TABLE XIII

NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Solid Waste Pollution Control Division
Workforce Projections to 1982 (est.)

| Position | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | %/annum turnover (average) | %/annum growth (average) |
|---|---|---|---|---|---|---|---|---|
| Administrator | 1 | 1 | 1 | 1 | 1 | 1 | N/A | 0% |
| Engineer | 3 | 3 | 4 | 5 | 5 | 5 | N/A | 12% |
| Environmental Specialist | 2 | 3 | 3 | 4 | 4 | 4 | N/A | 18% |
| Chemist | 0 | 1 | 1 | 1 | 1 | 1 | N/A | 20% |
| Planner | 0 | 0 | 1 | 1 | 1 | 1 | N/A | 20% |
| Other | 0 | 1 | 3 | 3 | 3 | 3 | N/A | 40% |
| Clerical | 1 | 1 | 1 | 1 | 2 | 2 | N/A | 20% |
| TOTAL | 7 | 10 | 14 | 16 | 17 | 17 | | 21% |

The increased number of environmental specialists is due partially to a hoped-for change in the 1972 state law to expand disposal site licensing and implementing PL 94-580. These positions would provide surveillance, inspection and technical assistance to local solid waste operations. The "Other" category includes support personnel such as a research analyst, a part-time attorney, and a part-time clerical person.

The planner position would be to fulfill some of the state planning needs imposed by Public Law 94-580, solid waste and hazardous waste. The engineers and environmental specialists would also have a role in implementing this law as resource recovery operations and assistance would almost certainly increase.

Not shown in the above table is a potential increase of from 15-20 staff positions within five years which may be required if a litter control law is enacted. Exact position classifications of these persons is

not certain, although planning, surveillance and enforcement activities would be emphasized by the law. A number of these positions might be away from the Lincoln office.

Depending on disposal site licensing requirements, the workforce employed by these facilities is likely to increase also. No figures are available in this area, but better cover operations, less burning, longer hours of operation and better planning is almost certain to result in substantial growth beyond the estimated one hundred now employed in these facilities.

D. Training and Certification

Staff members of the Solid Waste Pollution Control Division conduct two-day seminars for site operators, managers and public officials. This is generally to provide information but is the only formal training for most site operators. Division personnel also provide educational information to the public at large.

It is likely that if more small facilities require licensing operators at these sites will need some formal instruction to bring the facilities up to standard. Some assistance is provided now in resource recovery and hazardous waste handling; Division personnel noted that this effort may also have to be expanded depending on future legal requirements and needs.

It is planned, by one staff addition or by contract, to provide on-site training to operators and officials of licensed sites through a grant from the Old West Region Commission (.5 person in 1977 and .5 person in 1978).

E. Career Potential

The anticipated public sector growth will lead to a number of career opportunities although such extensive growth may not occur locally or in the private sector. Public Law 94-580 has definitely increased the need for planners, although this activity will not be as extensive as in the water field. Positions are likely to develop for highly-skilled persons in resource recovery and recycling fields. Hazardous waste management is a small field currently, but it was felt that some growth will be experienced in this area in the near future.

Careers for landfill personnel and equipment operators are likely to grow over the next five years. Growth in this area will hinge partially on the stringency of disposal site regulations.

F. Conclusion

The solid waste workforce trend in Nebraska appears to be one of marked growth; at least part of this expansion is a need to correct for understaffing to meet already existing needs. It appears that growth will take place in most occupational categories including disposal site personnel, planners, inspectors, and highly-trained engineers and scientists.

There exists a need for more training of disposal site personnel; additionally, an expanded educational effort might increase voluntary cooperation in such matters as solid waste burning and open dumping. The potential for a new litter control law is one of the greatest unsettled areas in Nebraska solid waste at the current time.

## VII. WASTEWATER

### A. Introduction

Water pollution and its related problems and programs have always represented one of the crucial environmental areas throughout the nation; Nebraska is no exception to this rule. Water resources in the state are not scarce, but they must be conserved for human, industrial and agricultural uses. Based on these uses it should not be surprising that a recent study of water pollution in the state showed the three largest polluters to be municipalities, industries and agriculture.

There are approximately 300 wastewater treatment facilities in Nebraska which provide various combinations of primary and secondary treatment. Currently there are no tertiary treatment facilities in the state. Nebraska does not presently have a mandatory wastewater facility operator certification program; however, the Nebraska Water Pollution Control Association administers a voluntary program which will be discussed in the Training and Certification sub-section.

The magnitude of the water pollution problem in the state can be seen in a "point source" pollutant inventory conducted pursuant to Public Law 92-500, the Federal Water Pollution Control Act Amendments of 1972. At present 1,072 point sources have been identified with the breakdown as follows: 233 industrial, 397 municipal, and 442 feedlots.

Responsibility for wastewater treatment facilities, point sources and other water pollution problems rests primarily with the Water

Pollution Control Division of the Department of Environmental Control (DEC). The Division is divided into seven sections: Water Quality Planning, Wastewater Facilities, Permits and Compliance, Surveillance and Monitoring, Special Studies, Operator Training, and Laboratory. The Division administers Public Law 92-500 and the Nebraska Environmental Protection Act as it relates to water. Basic functions include:

1) Establishment of effluent limitation guidelines;
2) Issuance of wastewater and point source discharge permits under National Permit Program authority;
3) Review of permits and continual compliance monitoring;
4) Administration of construction permits and construction grant program funds;
5) Comprehensive monitoring and surveillance to determine state water quality.

Nebraska is perhaps unique in its establishment of an Agricultural Pollution Control Division within DEC to deal with water pollution from livestock wastes. The Division administers a construction permit program for feedlot operations which do or have the potential to cause pollution. Approximately 7,000 of the state's 20,000 livestock operations have been inspected with 797, or 11 percent, found to require some form of pollution control facility. The Agricultural Pollution Control Division is divided into three sections: Engineering, Inspection and Enforcement, and Surveillance and Non-Point Sources.

Another state agency active in the water pollution and conservation field is the Natural Resources Commission (NRC). One key function of NRC is working closely with the Water Pollution Control Division in Section 208 planning under Public Law 92-500. Currently NRC is the state lead agency for Section 208 activities. Other responsibilities of the Commission include: flood plain management and enforcement; field surveys of water and topography mapping; survey soil and water resources including a comprehensive state water and land plan; and administration of the Natural Resources Data Bank.

B. Workforce Profile

Each of the agencies involved with water pollution control was contacted and in-depth interviews were conducted. The staffing of each division must be analyzed to acquire a composite of public sector wastewater and water pollution control for the state.

The Water Pollution Control Division is staffed by thirty-nine persons and is the largest division in DEC. Thirty-one of the employees are located in the main Lincoln office, three are in the laboratory also in Lincoln, and the remaining four work in the North Platte office. The following table provides a breakdown of staff positions by occupational category.

TABLE XIV

NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Water Pollution Control Division
Current (1976) Staffing Level

| Position | 1976 |
|---|---|
| Engineer | 5 |
| Life Scientist | 21 |
| Chemist | 5 |
| Other | 4 |
| Clerical | 4 |
| TOTAL | 39 |

Of the five engineers, two are sanitary engineers, two are civil engineers and one is a structural engineer; they are generally involved in the Wastewater Facilities Section. The chemists and life scientists comprise the bulk of the Permits, Surveillance, Water Quality and Laboratory Sections. The "Other" category includes one administrator, one geologist, one trainer, and one data processor.

The Agricultural Pollution Control Division is staffed by eleven employees, ten of whom are in Lincoln and one in North Platte. Staff breakdown for the Division by position is set forth in the following table.

TABLE XV

NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Agricultural Pollution Control Division
Current (1976) Staffing Level

| Position | 1976 |
|---|---|
| Engineer | 2 |
| Environmental Specialist | 7 |
| Administrator | 1 |
| Clerical | 1 |
| TOTAL | 11 |

Both engineers have agricultural engineer training. The environmental specialists are primarily degreed personnel in agronomy, biology or animal science. Most work of this Division is in eastern Nebraska where large-scale confined feeding operations are concentrated.

The staff of the Natural Resources Commission is larger than either Division of DEC noted above, but NRC functions encompass many areas not as directly related to water pollution prevention and control. The Commission has a staff of 63 employees with a breakdown according to occupational position as set forth in the following table.

TABLE XVI

NEBRASKA NATURAL RESOURCES COMMISSION

Current (1976) Staffing Level

| Position | 1976 |
|---|---|
| Engineer | 13 |
| Engineer Technician | 21 |
| Draftperson | 10 |
| Biologist | 2 |
| Other | 7 |
| Administrator | 3 |
| Clerical | 7 |
| TOTAL | 63 |

Most of the engineer positions are filled by civil engineers although there are two sanitary engineers also. The "Other" category includes the following: two soil and water conservationists, one attorney, one geologist, one computer programmer, one economist, and one natural resource scientist. The large number of technicians

and draftpersons are involved in field surveys, mapping, and resource inventory activities for the Commission.

As previously noted, Section 208 Planning activities are carried out primarily by NRC; but additional planning and support personnel for this effort are provided by the DEC Water Pollution Control Division, the Office for Planning and Programming, and the Department of Water Resources. The exact number of staff persons in each agency involved in "208" activity is impossible to determine, but the planning program is growing and requiring greater workforce input.

The 300 wastewater treatment facilities in the state are staffed by approximately 500 operators. Because there is no mandatory certification requirement, only 344 of the operators have received voluntary certification. The following table shows the number of certified treatment facility operators by grade.

TABLE XVII

Certified Wastewater Treatment Plant Operators
Current (1976) Staffing Level

| Grade | 1976 |
|---|---|
| I | 65 |
| II | 7 |
| III | 162 |
| IV | 110 |
| TOTAL | 344 |

Grade I is the highest classification and Grade IV is the lowest. Most treatment facilities have not been officially classified, so shortages or excesses cannot be determined. Plant operators must provide chemical analysis of effluents to DEC. This laboratory support

is provided on a part-time basis by six laboratories not connected with the treatment facility.

C. Workforce Projections

Workforce projections represent best professional judgements of agency personnel. The wastewater and water pollution control field has undergone significant expansion in recent years and, because of the importance of clean water, future growth and activity represents an extremely changeable field.

Over the next five years, significant growth is expected in most water pollution agencies. The Water Pollution Control Division has projected workforce needs to grow to 54 from the present 39. The following table shows the Division's expected workforce growth by occupational category.

TABLE XVIII

NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL

Water Pollution Control Division
Workforce Projections to 1982 (est.)

| Position | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | %/annum turnover (average) | %/annum growth (average) |
|---|---|---|---|---|---|---|---|---|
| Engineer | 5 | 5 | 7 | 8 | 9 | 9 | 15% | 13% |
| Life Scientist | 21 | 23 | 26 | 27 | 27 | 27 | 15% | 5% |
| Chemist | 5 | 6 | 7 | 7 | 7 | 7 | 20% | 7% |
| Other | 4 | 5 | 7 | 7 | 7 | 7 | 15% | 13% |
| Clerical | 4 | 4 | 4 | 4 | 4 | 4 | n/a | 0 |
| TOTAL | 39 | 43 | 51 | 53 | 54 | 54 | 15% | 7% |

The need for the immediate addition of a number of professionals was stressed by Division personnel because of increasing legislative mandates. The proposed Cleveland-Wright Amendment to the Federal Water Pollution Control Act would impose state assumption of the construction grant program and cause a need for more engineers. Personnel needs included in the "Other" category are a planner, an operator trainer, and a laboratory technician. Other reasons cited for increased workforce needs are to better perform present Division obligations and for the potential assumption of some other functions. The Division increased by four people from 1975 to 1976.

The turnover rate noted in the table is based on 1975-76 figures and is slightly higher than normal. The turnover problem has been most critical with engineers and other upper-level professionals. Upgrade training and salary adjustments have been implemented to help improve this situation.

The need for more laboratory facilities and lab personnel was also cited by the Division. Budget expenditures and the fate of some federal proposals will have the most bearing on this and other workforce projections.

Little growth is anticipated over the next five years within the Agricultural Pollution Control Division. While the need for some expansion was pointed out, budget limitations will keep growth at a minimum. In particular more engineers are needed to assist in feedlot construction design and approval; however, it is this category which is most difficult to fill because of salaries in the private sector.

As more permits are issued and fewer operations remain to be inspected, the Division expects a workforce shift from inspection to surveillance and monitoring needs. Again Section 208 of Public Law 92-500 was cited as the key to workforce projections; the extent of "208" planning, non-point source management, and the kinds of conservation required may lead to greater personnel needs that are impossible to determine at the present time.

Water is an extremely crucial resource in Nebraska and there has been a great deal of legislative activity on water matters recently. Because of this, the Natural Resources Commission expects to experience moderate growth over the next five years. The following table represents the Commission's expected workforce growth by category.

TABLE XIX

NEBRASKA NATURAL RESOURCES COMMISSION

Workforce Projections to 1982 (est.)

| Position | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | %/annum turnover (average) | %/annum growth (average) |
|---|---|---|---|---|---|---|---|---|
| Engineer | 13 | 14 | 16 | 18 | 20 | 21 | n/a | 10% |
| Engineer Tech. | 21 | 22 | 22 | 22 | 23 | 23 | n/a | 2% |
| Draftsperson | 10 | 10 | 10 | 11 | 11 | 11 | n/a | 2% |
| Biologist | 2 | 2 | 2 | 2 | 2 | 2 | n/a | 0 |
| Other | 7 | 7 | 8 | 8 | 8 | 8 | n/a | 3% |
| Administrator | 3 | 3 | 3 | 3 | 3 | 3 | n/a | 0 |
| Clerical | 7 | 7 | 7 | 7 | 7 | 7 | n/a | 0 |
| TOTAL | 63 | 65 | 68 | 71 | 74 | 75 | | 4% |

Water use problems, drought conditions and greater irrigation will be the focal point of NRC work in the years to come. As a result, the bulk of workforce growth will be in engineer and engineer-related areas.

Planning was cited as the area thought to be most affected by future legislative mandates.

A past turnover rate of 20% to 25% fell to only 10% in 1975-76. The engineering profession is the most affected by turnover because of salaries in the public sector as compared to the private sector. It was impossible to determine what future turnover trends will be.

Growth in the number of certified wastewater plant operators depends largely on whether or not a mandatory certification law is enacted. Legislation to require certification has been introduced in prior years but has failed to pass. It is likely that the total number of operators, now approximately 500, will not increase substantially if certification becomes mandatory; the result will be more certified operators, but not more operators. Additionally, shifts can be expected among grade levels as treatment facilities are classified.

D. Training and Certification

As noted previously, Nebraska does not have a mandatory certification law for wastewater treatment plant operators. But an effort has been made to provide training and certification on a voluntary basis. The DEC Water Pollution Control Division cooperates with two community colleges in training operators; because of increasing efforts in this area, the Division expects to employ a full-time training officer in the near future. In addition the University of Nebraska Extension Service provides assistance in training on land application of effluents and sludge.

Plans within the Division call for better training opportunities through curricula packages. Eventually water quality and general science instructional resources may be provided to high schools and community colleges.

A necessary amount of on-the-job training takes place in both DEC Divisions and the NRC on water programs. The Water Pollution Control Division participates in an internship program of water quality studies and monitoring for its life scientists; Chadron State and Kearney State are the two colleges most prominently involved in this effort. Instructional and other assistance is provided to these programs by DEC.

An effort is made to send DEC personnel to seminars and training sessions. In the past several staff persons have attended the training facility in Neosho, Missouri. With the need for more planning expertise for Section 208 and the potential for mandatory operator certification, training activities are likely to expand in Nebraska.

E. Career Potential

Moderate growth projections for Nebraska's public sector water pollution agencies indicate strong career prospects in this field. Turnover, particularly among engineers, is likely to result in even more positions. If mandatory operator certification is imposed, the need for trained personnel in this area will also rise sharply.

Engineers, engineering technicians and planners are the occupations in which most growth will occur. The implications of Section 208 planning requirements will require engineers and other trained

planners in all water areas. Surveillance and monitoring needs will also be important as non-point source requirements become more stringent.

The fields of agronomy, biology, and animal science were noted by Agricultural Pollution Control personnel as career growth areas. People trained in these fields will be best able to carry out inspection and surveillance needs of the Division. Engineers are also needed in this Division.

Operators in Grade I and II classifications will be more in demand if a mandatory certification law is passed. Under the voluntary program few operators have been certified in these upper-level grades. Laboratory, training and other support occupations may show some growth under a mandatory certification law.

F. Conclusion

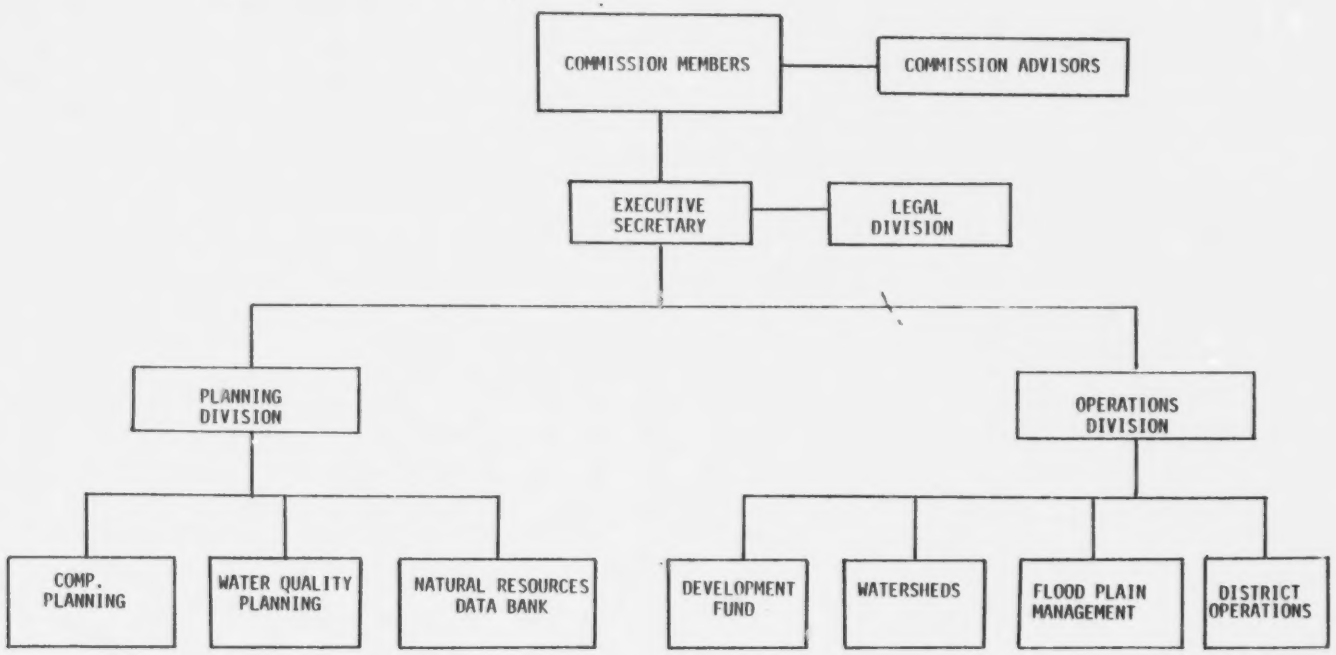
New legislative mandates, present staff over-extension, and greater planning activity all add up to moderate workforce growth in the wastewater and water pollution control agencies. Budget limitations may, however, slow anticipated growth.

It is generally felt that training programs in existence are adequate to provide the upper-level professionals who will be needed; the problem in this area is more likely to be with salaries. A more critical area of educational need is at the two-year technical level and for treatment facility operators. While on-the-job training is expected for most categories, better training could reduce reliance on it.

In conclusion, it should be noted that discharge limitation requirements of the 1980s are likely to have a significant impact on water pollution control activities for the next several years.

NEBRASKA NATURAL RESOURCES COMMISSION

Figure 2



VIII. ENERGY

A. Introduction

The State of Nebraska is not rich in energy resources, and must import approximately 94 percent of its energy needs. Nebraska is fortunately surrounded by states which are outstanding potential energy suppliers; Wyoming, Colorado and the Dakotas have good supplies of coal, oil, hydro and nuclear resources, and Kansas and Oklahoma produce major amounts of oil and gas.

This is not to say that Nebraska is devoid of energy resources. The state has twenty hydroelectric plants which supply a modest amount of the energy needs; all hydro sites have apparently been developed and no new plants have been constructed since 1940. Oil and gas have been produced in Nebraska's panhandle region since the 1940s with petroleum reserves estimated at forty million barrels. Nebraska ranks twenty-second among the thirty-one oil producing states, and as of 1974 had 1,107 wells producing oil and twenty-seven wells producing gas.

Coal fields exist in southeastern Nebraska, but at such depths that it is considered uneconomical to mine it. It is estimated that 7.5 billion tons of coal exist at depth of over 2,000 feet as a part of the coal field extending from Kansas through Iowa. Currently the state has two nuclear power facilities - a 455 megawatt plant at Fort Calhoun and a 800 megawatt plant at Brownville.

Nebraska is unique in that it has no private power companies and two large public power districts supply nearly 90 percent of the state's

electric energy. These are the Omaha Public Power District (which operates the Fort Calhoun facility) and the Nebraska Public Power District (which operates the Brownville facility). There are various other cooperatives, associations and municipalities which provide the remainder of the state's electrical energy needs.

There are two state agencies involved in energy matters. The State Energy Office was established in 1973 within the Department of Revenue to administer the state allocation program. Assistance is provided to consumers and dealers regarding allocation terms and to the state agencies on overall energy activities. The office is currently involved in energy conservation activities, making energy need projections, and coordinating alternative energy research.

The Oil and Gas Conservation Commission was established in 1959 to curb wasteful practices in oil and gas production. The Commission also encourages the maximum recovery of oil and gas and promotes re-cycling, pressure maintenance, and secondary recovery operations toward this same goal. The Power Review Board, within the Department of Water Resources, and the various public power districts are also active in energy matters.

B. Workforce Profile

The State Energy Office now has a staff of seven persons; the breakdown by occupational category is shown in the following table.

TABLE XX

NEBRASKA ENERGY OFFICE

Current (1977) Staffing Level

| Position | 1977 |
|---|---|
| Director | 1 |
| Fuel Allocation Officer | 1 |
| Staff Energy Co-ordinator | 2 |
| Research Analyst | 1 |
| Clerical | 2 |
| TOTAL | 7 |

Being within the Department of Revenue, the office can draw on personnel of the Department on a short-term basis when the need demands it. It should be noted that in 1973-74 there was a staff of eleven for the Allocation Office. The four additional employees not shown above were designated as allocation technicians; the main function of these technicians was in providing allocation information to consumers, dealers and others who made telephone inquiry.

Nine people comprise the staff of the Oil and Gas Conservation Commission. This total includes three commissioners and a chief administrator, a geologist, two field inspectors and two secretaries. Normally the commissioners have experience in the production of oil and gas, and the administrator is required by law to be a petroleum engineer.

No attempt has been made to obtain workforce information for private energy fields or utility operations. According to the Nebraska Blue Book for 1974-75, over 400 employees are directly involved in the oil industry in production and refining operations.

C. Workforce Projections

Growth in Nebraska's energy sector is expected to be limited, although it is difficult to project in this area at the present time. The national energy situation is changing very rapidly and the Nebraska picture is very much dependent on these changes.

The overall energy shortage may signal a return to more stringent allocation and management requirements, similar to those of 1974. Government research and priorities can also be expected to affect workforce needs; Nebraska is anticipating greater use of nuclear power, but this may change if the nuclear area is de-emphasized in favor of solar or other energy sources.

Because the area is so changeable, the Energy Office cannot make any firm workforce projections. It is quite likely that some growth will occur, particularly if allocation or regulation requirements are re-imposed.

In addition to the two facilities previously mentioned, OPPD and NPPD entered into a co-ownership agreement to construct a nuclear power plant with a 1,150 megawatt capacity adjacent to OPPD'S Fort Calhoun Station Unit No. 1. This Station was scheduled for commercial operation in 1983, but in February 1977, OPPD terminated its joint participation in the unit without the concurrence or approval of NPPD. The board of directors of NPPD have since adopted a resolution directing their management to proceed with development of a contingent power

supply plan which could be implemented in the event that determination of OPPD's participation in the project is not cured.

Whether NPPD will continue the project on its own has not been determined.

D. Training and Certification

The only permit activity in the energy field is for drilling permits issued by the Oil and Gas Conservation Commission. The role of the Commission in issuing permits is to prevent waste, and cannot relate to market demand.

There is very little training which takes place for public sector energy employees. The Energy Office relies on on-the-job training for its very specific role, and the Oil and Gas Conservation Commission stresses prior experience in the field for its personnel.

E. Career Potential

Current limited growth projections indicate very little career potential in Nebraska energy. Other than power districts, the present public workforce is minimal; expansion will likely be in those fields from which personnel are now drawn, i.e., engineers and production people.

Energy trends for the state were set forth by the University of Nebraska College of Engineering and Technology in "An Appraisal of Energy Utilization in Nebraska" in December, 1974. Possible areas of career development can be inferred from the following trends:

1) Nuclear power is becoming a major part of the power supply, and will account for an increasing part of the total in the near future.

2) Oil and natural gas will account for a decreasing part of the total. Oil prices are already the most expensive part of the energy budget, and the supply of gas is the most limited part of the total. Substitutes for gas from coal are possible, but gasification plants are still in pilot plant stages and considerable engineering work must be done before these plants can be considered ready to make the substitution. The same observation applies to coal liquefaction processes which may provide substitute motor fuels.

3) Hydroelectric power will be available in about the same absolute amounts in the future, but will represent a decreasing proportion of the total energy budget. The per capita electric load in Nebraska has been growing at an annual rate of 6.71%, and will probably continue to do so. The annual rate of increase for the total energy budget has been about 4.3%, or the electric portion of the energy budget is increasing.

4) Coal represents a small (5.8%) portion of the total budget, but its share will increase in the near future, especially if practical means can be found to gasify and liquefy it. Transportation also represents a problem in the near future, because all the coal utilized in the state is brought in by rail, and there is a limit to the amount of traffic that can be handled by the railroads without major additions to their facilities.

F. Conclusion

Future energy workforce needs in Nebraska are as unsettled as the national energy picture. One thing that has been demonstrated is the state's need for outside supplies of energy; the purchase, transportation and allocation of these resources are likely to be the focus of Nebraska's public sector energy workforce in the coming years.

# Selected Post Secondary Institutions With Formal Environmental Energy Programs

Nebraska higher education institutions have not yet developed environmentally related education programs in wide varieties or large numbers. This lack of development can perhaps be attributed to the fact that Nebraska's environmental problems are not as critical as those of other states. A number of two-year institutions are beginning to move into the environmental field, among these are Northeast Technical Community College and Southeast Community College with programs in Environmental Technology and Agricultural Chemicals. At the four-year level Chadron State College has cooperated in operator training courses and is attempting to establish a Center for Environmental, Historical, and Multi-Cultural Background Studies.

The above environmental education programs are examples of available curricula. Programs at the University of Nebraska and at Central Technical Community College are discussed in greater detail in the following pages.

SENIOR INSTITUTIONS

University of Nebraska
Lincoln, Nebraska

Program: Environmental Health (B.S.)

Hours required for major: Semester - 20
Program Inception: 1971
Staff Size: Three part-time professors, plus others in support courses
Enrollment: 40
Graduates (1976): 9
Placement: 6
Graduate Work: 2

Courses

Epidemiology
Urban and Rural Health
Environmental Health
Occupational Health
Health Education
Community Health
Radiation Safety
Independent Study
Microbiology

Program: Sanitary Engineering (M.S., PhD.)

Hours required for major: Semester - 30-36
Program Inception: 1968
Staff Size: Three full-time professors (2 Ph.D.'s)
Enrollment: 10
Graduates (1970): 8
Placement: Nearly all as consulting engineers; others in public agencies and industry
Graduate Work: Generally few

Courses

Soil and Water Conservation
Bio-Environmental Engineering
Hydrologic Modeling of Small Watersheds
Air Pollution Assessment and Control
Environmental Pollution Control

Water Resources Development
Environmental Pollution Control
Water Resources Planning
Water Resources Engineering
Advanced Water Treatment
Advanced Sewage Treatment
Industrial Waste Treatment
Industrial Waste Laboratory
Water Quality and Pollution
Hydrology
Limnology
Conservation Engineering
Animal Wastes

## COMMUNITY COLLEGES/TECHNICAL INSTITUTIONS

Central Technical Community College
Hastings, Nebraska

Program: Environmental Technology/Wastewater Treatment Technology (A.S., 2-year diploma, 1-year diploma)

Hours required for major: Quarter - (A.S.) 43, (2-year) 60, (1-year) 39
Program Inception: 1972
Staff Size: Two full-time professors (1 Ph.D.)
Enrollment: 21
Graduates (1976): 5
Placement: 5
Graduate Work: 0

Courses - Wastewater

Introduction to Wastewater Treatment
Operation and Maintenance of Sewage Collection System
Wastewater Treatment Facility
Biological Processes of Wastewater Treatment
Pump Maintenance
Plant Control Procedures
Wastewater Chemical Analysis
Introduction to Atomic Absorption
Pesticide Analysis
Heavy Metal Analysis
Wet Chemistry
Wastewater Microbiology
Wastewater Chemical Analysis
Water Pollution Ecology
Field Lab Procedures
Calculations for the Wastewater Treatment Technician
Natural Purification Cycle
Plant Operator Certification Review
Occupational Problems

Program: Agricultural-Chemicals Technology (A.S., 2-year diploma, 1-year diploma)

Hours required for major: Quarter - (A.S.) 43, (2-year) 60, (1-year) 39
Program Inception: 1974
Staff Size: Three full-time professors (1 M.S.)
Enrollment: 40

Graduates (1976): 9
Placement: 8
Graduate Work: 0

Courses

Agricultural Environmental Orientation
Agricultural Chemicals Orientation
Agricultural Chemicals Identification
Selection of Pesticides and Herbicides
Application of Chemicals
Occupational Problems
Pesticide Applicator

# State Legislation

## NEBRASKA GENERAL

TITLE:

Environmental Protection Act of 1971
Nebraska Statutes 81-1501

PURPOSE:

To protect all elements of the environment, air, water and land, and protect from pollution all resources of the state; to create an environmental control council and a department of environmental control.

DEFINITIONS:

1. Air contaminant
2. Air pollution
3. Chairman
4. Complaint
5. Control
6. Department
7. Director
8. Disposal system
9. Emissions
10. Person
11. Rule
12. Sewerage system
13. Treatment works
14. Wastes
15. Refuse
16. Garbage
17. Rubbish
18. Junk
19. Land pollution
20. Water pollution
21. Waters of the state
22. Point source
23. Effluent limitation
24. Schedule of compliance

ADMINISTERING AUTHORITY:

Department of Environmental Control
Environmental Control Council

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To develop comprehensive air, water and land pollution abatement plans;
To act as state lead agency in air, land and water matters;
To conduct studies and investigations regarding pollution and control;

AUTHORIZATIONS (Cont'd)

To approve construction of all disposal systems;
To issue permits regarding air, water and land discharges and pollution;
To require pollution control devices and equipment, and permits therefor;
To monitor air, water and land quality and establish standards therefor;
To establish effluent limitation, performance, toxic pollutant and pretreatment standards.

PROHIBITED ACTS:

To cause pollution of any air, land or water of the state;
To discharge pollutants in violation of quality standards;
To allow water discharge, disposal system construction, control devices without permit;
To dispose of refuse, garbage or rubbish except at disposal site;
To allow accumulation of junk.

EXEMPTIONS:

Variances may be granted; local government units can be exempted if have own standards;
Solid waste disposal of household;
Air sources solely in-plant.

PENALTIES:

Non-water violations - misdemeanor and fines of from $1,000 to $5,000 plus $10 per day;
Willful water violations - fines of up to $5,000 or six months in jail;
Liability imposed for fish and wildlife damage;
Junk violations - misdemeanor and fines up to $1,000.

# NEBRASKA NOISE AND AIR

TITLE:

Control of Smoke Emissions and Noise Law
Nebraska Statutes 60-2201

PURPOSE:

To provide for the control of noise and smoke emissions from certain motor vehicles.

DEFINITIONS:

1. Deisel-powered motor vehicle
2. Motor vehicle
3. Smoke
4. Smokemeter
5. Opacity
6. Smoke control system
7. Administrator
8. State Enforcement officials
9. This act

ADMINISTERING AUTHORITY:

Department of Environmental Control

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To conduct smokemeter tests;
To conduct noise measurement tests;
To generally enforce the act.

PROHIBITED ACTS:

To discharge smoke emissions from diesel-powered motor vehicle in violation of standards;
To remove or alter smoke control mechanisms;
To sell or operate 10,000 pound vehicles not in conformance with noise limitations.

PENALTIES:

Fines of from $25 to $100.

# NEBRASKA PESTICIDES

TITLE:

Pesticide Applicator Law
Nebraska Statutes

PURPOSE:

To provide for the control of pesticides and the training and certification of pesticide applicators.

DEFINITIONS:

1. Restricted use
2. Private applicator
3. Commercial applicator

ADMINISTERING AUTHORITY:

Department of Agriculture
Cooperative Extension Service

AUTHORIZATIONS:

To provide restricted use pesticide training;
To issue regulations and standards for certification;
To certify pesticide applicators.

CERTIFICATION OR LICENSING:

Commercial and private applicators shall be certified; commercial applicators must receive training and show competence, but private applicators may be certified without either.

PROHIBITED ACTS:

To use restricted pesticides without certification;
To violate any provision of the act.

PENALTIES:

Fines of from $10 to $50.

# NEBRASKA POTABLE WATER

TITLE:

Safe Drinking Water Act
Nebraska Statutes

PURPOSE:

To provide for the control and safety of public water supplies in the state.

DEFINITIONS:

1. Council
2. Director
3. Designated agent
4. Major construction
5. Operator
6. Owner
7. Person
8. Water supply system
9. Public water supply system
10. Drinking water standards

ADMINISTERING AUTHORITY:

Department of Health
Advisory Council on Public Water Supply

AUTHORIZATIONS:

To establish minimum drinking water standards;
To inspect and issue permits to public water supply systems;
To approve water supply system construction or alteration;
To enter agreements with other agencies and act as the state lead agency in drinking water matters;
To certify public water supply system operators.

CERTIFICATION OR LICENSING:

All operators must be certified by 1979; standards of qualification are to be developed and examinations may be required.

PROHIBITED ACTS:

To operate a public water supply system without a permit in 1978;
To fail to have certified operator beginning in 1979;
To undertake construction or alteration without approval.

EXEMPTIONS:

May be granted by the Department.

PENALTIES:

Fines of from $100 to $5,000 plus $50 per day.

# NEBRASKA RADIATION

TITLE:

Radiation Control Act
Nebraska Statutes 71-3501

PURPOSE:

To institute a program of radiation source control and utilization consistent with the public health and welfare.

DEFINITIONS:

1. Radiation
2. Radioactive material
3. Radiation device
4. Source of radiation
5. Undesirable radiation
6. Person
7. Registration
8. Department
9. Coordinator
10. Council
11. Electronic product
12. License
13. By-product material
14. Source material
15. Special nuclear material

ADMINISTERING AUTHORITY:

Department of Health
Radiation Advisory Council

AUTHORIZATIONS:

To coordinate state radiation regulation;
To conduct studies and investigations regarding radiation sources;
To issue regulations pursuant to the act;
To register radiation sources as necessary to protect public health;
To require records of radiation sources;
To enter into state and federal agreements.

PROHIBITED ACTS:

To fail to register radiation sources as required by regulation;
To fail to keep any required records.

EXEMPTIONS:

Non-risk radiation sources can be exempted; common carriers of material and sources.

PENALTIES:

Fines of from $50 to $200.

NRC AGREEMENT STATE: Yes